Philadelphia, 20th April 2

Sir,

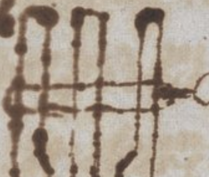
I respectfully offer the following remarks by way of reply to the main question for information in the letter of J. H. White, Col. R.E. from H. M. Mint, Bombay.

The method of casting bars (what we call Ingots) in the Bombay Mint is so different from ours, that the cause of porosity may be different. They pour into an open mould, we into a closed mould. We are rarely troubled with blistering or porosity, which may result from too high or too low a temperature in pouring, or blistering may be produced by improper annealing. The presence of selenium has lately been found to dispose silver to blister in casting. The heat of the moulds is important, for we find the metal more compact after they have been heated by the first round of casting. We cast in moulds placed vertically, and continue pouring

10th April

into the gate until it is rather over-filled, thus preventing porosity at the upper end of the ingot.

Perhaps a short description of our mould will enable Col. White the better to understand the difference in our two modes of casting. In each of our moulds two ingots are cast. They consist of three pieces of cast-iron, the two outer pieces containing each a groove of the proper size of the ingot to be made, & the middle piece being a rectangular piece of cast iron laid between the other two. All three are bound together by a hoop, and secured by the turn of a screw.



The wood cut at the side exhibits a section through the middle in one direction, showing the flare of the ingot below (which enables the rolls to nip the ingot), & the little flare or casting gate above. The dimensions of the grooves, which are of course the exact size of the ingots, are, 13 inches in height, 10th April. - 2

$1\frac{5}{8}$ in. to $1\frac{1}{8}$ in. in width, and $\frac{9}{16}$ to $\frac{7}{16}$ in. deep. The cast iron is one inch thick all around. The larger dimensions above are those of the silver dollar, the smaller those of the quarter dollar. About a dozen such double moulds are placed on a tray beside each other, and the caster pours the metal rather fast, without stopping, until the gate is quite full. The moulds are opened, to discharge the two ingots, reclosed after greasing, and set in their place for refilling. We melt over 3000 oz. silver in a black lead pot, and cast each hour 70 of the larger and 100 of the smaller ingots, always leaving 200 to 300 oz. in each pot to quicken the melting of the next charge of cold metal. Six such melts and castings fills a day of 8 hours work & casts 18 000 oz. of ingots. The 6 furnaces we usually employ execute about 110 000 oz. of cast metal, yielding almost precisely one half that amount of coin,

Mint of the United States at Philadelphia,
MELTING AND REFINING DEPARTMENT,

Philadelphia, 10th April 1882

in the usual day's work, or when pressed, 160,000 oz. metal,
by over time
= 80 000 oz. coin. When the ingots are cooled (in water) their tops are cut off & their feathered edges, if any, filed off. The exact thickness of the rolled and drawn ingots, now become strips ([illegible] their slips) is determined by cutting out a piece & weighing it as they do.

Very respectfully yours
Jas C Booth
M & R

Hon. A. Loudon Snowden.
Superintendent.